



SAN BERNARDINO MICROWAVE SOCIETY, Incorporated

FOUNDED IN 1955

A NON-PROFIT AMATEUR TECHNICAL ORGANIZATION DEDICATED
TO THE ADVANCEMENT OF COMMUNICATIONS ABOVE 1000 MC.

W6IFE Newsletter December 2009 Edition

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At the **3 December 2009** SBMS meeting the "Tech Talk" will be 1296 MHz rig designs. The SBMS meets at the American Legion Hall 1024 Main Street (south of the 91 freeway) in Corona, CA at 1900 hours local time on the first Thursday of each month. Check out the SBMS web site at <http://www.ham-radio.com/sbms/>.

REMINDER- NO PARKING IN THE CHURCH LOT

Last meeting- Rein spoke about the WSPR (weak signal propagation reporter) mode of the WSJT series of digital software communications packages. Pat, N6RMJ is continuing on the MUD2010 planning and has the hotel confirmed. Tours under consideration are JPL Labs and Goldstone Space Communications Center. Kerry, N6IZW and Greg, K6QPV brought a pick up load of Chuck WA6IGP estate items for sale. 33 people present.

Scheduling.

12 Dec SBMS Christmas Party at Dennis', W6DQ QTH

7 January- Agilent on New equipment

4 February- Open- Suggestions?

MUD 2010 Wednesday October 20 ----- Sunday October 24 Los Angeles area. SBMS is sponsoring it.

12 Dec SBMS Christmas Party at Dennis', W6DQ QTH in Fullerton

Wants and Gots for sale.

For Sale- Gonset 20mtr 5 elm beam \$10; 220MHz heavy duty 7 el beam \$15 ; 6 ft spin aluminum dish (no back mounting support) \$50; Hallicrafter HT32A transmitter with manual \$50, Scott Navy WW2 18 KHz-20 MHz receiver \$30 Bill WA6QYR 760-375-8566 bburns@ridgenet.net.

For Free- Early Heathkit items- G-2 sine/square wave generator; V-5 VTVM; C-1 condenser checker. Later Heathkit- 5 inch scope O-10
Bill WA6QYR 1-760-375-8566

For Sale: TPL 3-4w in 100w out UHF amplifier 12vdc \$100 Dick WB6DNX 714-529-2800
For Sale: 5 MHz OCXO, 10 MHz OCXO \$20 each, HP 1741 100 MHz scope \$100 Dave N6TEB



SBMS members sort through boxes of stuff from the Chuck, WA6IGP estate for the benefit of his wife.



Activity reported at the November SBMS meeting-- Dick WB6DNX did some counter checking; Chuck WA6EXV is working on some Beacons; Bill, WA6QYR is working on some high power 144 MHz gear; Kerry, N6IZW has been working on some low phase noise Mini-Circuit VCO circuits; Greg K6QPV worked on the San Miguel beacon for 10 GHz; Chip, N6CA drove 2000 miles during the contest and has sold 18,000 Angle Linear units; Kent, K6WCI now has 8w on 10 GHz; Dave, N6TEB built a DEMI surface mount 10 GHz 8w amplifier and wrote a 10 GHz contest log program; Dick WB6JDH had fun in the contest; Don, KE6BXT did some ATV; Wayne, N6NB did MUD and roved in Utah with 50 MHz to 10 GHz; Gary K6VCR retired but is very busy; Tom WB6HYH is collecting parts; Mel, WA6JBD updated his PCB making process; Peter, K6PTL is collecting MUD2010 speakers and tour locations; Dan, W6DFW built more 10 GHz antennas; Bob, WA6VHS blew his 10 GHz rig; Dick, K6HIJ did a MUD talk and built some 47 GHz waveguide switches; Jerry, N7EME had fun in the contest; Pat, N6RMJ did some yard work; Rein, W6SZ did some SDR work; Tom, WB6UZZ has a bench top mill; Chris W6EWX did some 10 GHz work; George, K6MBL was displaced due to the fires; Stan, KE6ZC did some SDR work; Larry, K6HLH traveled to MUD and on for vacation and had some 144 MHz EME contacts; Jeff, KN6VR went to MUD and worked on network analyzer; Chris, N9RIN was at work; John, KJ6HZ cleaned garage; ATV check ins- AC6RB, W6EV, K6BNN.

Call for Papers 14th Annual Southeastern VHF Society Conference April 23rd and 24th, 2010 Morehead State University in Morehead, Kentucky

The Southeastern VHF Society is calling for the submission of papers and presentations for the upcoming 14th Annual Southeastern VHF Society Conference to be held at Morehead State University in Morehead, KY on April 23rd and 24th, 2010. Papers and presentations are solicited on both the technical and operational aspects of VHF, UHF and Microwave weak signal amateur radio. Some suggested areas of interest are:

Transmitters

Receivers

Transverters

RF Power Amplifiers

RF Low Noise Pre Amplifiers

Antennas

Construction Projects

Test Equipment and Station Accessories

Station Design and Construction

Contesting

Roving

DXpeditions

EME

Propagation (Sporadic E, Meteor Scatter, Troposphere Ducting, etc.) Digital Modes (WSJT, etc.) Digital Signal Processing (DSP) Software Defined Radio (SDR) Amateur Satellites Amateur Television

In general papers and presentations on non weak signal related topics such as FM repeaters and packet will not be accepted but exceptions may be made if the topic is related to weak signal. For example, a paper or presentation on the use of APRS to track rovers during contests would be considered.

The deadline for the submission of papers and presentations is February 5, 2010. All submissions for the proceedings should be in Microsoft Word (.doc). Submissions for presentation at the conference should be in PowerPoint (.ppt) format, and delivered on either a USB memory stick or CDROM or posted for download on a web site of your choice.

Pages are 8 and 1/2 by 11 inches with a 1 inch margin on the bottom and 3/4 inch margin on the other three sides. All text, drawings, photos, etc. should be black and white only (no color).

Please indicate when you submit your paper or presentation if you plan to attend the conference and present there or if you are submitting just for publication. Papers and presentations will be published in bound proceedings by the ARRL. Send all questions, comments and submissions to the program chair, Robin Midgett K4IDC via K4IDC at comcast dot net.

For further information about the conference please go to <http://www.svhfs.org> www.svhfs.org
Thank you,
Robin Midgett K4IDC
2004-2005 Conference Chair, SVHFS



More lookers at the WA6IGP estate items.

Threads.

Can some of you technical folks on this list please explain why the Bearing & Distance calculators show reverse bearings that are not 180 degrees different from the forward bearing?

Is it the fact that the earth is not a true sphere or something else?

I've used the FCC calculators, and Wingrid from W4SM, and others, and find similar results.

None of the calculators state whether the bearings are true or magnetic, but I'm assuming they are all in terms of the true heading and not the magnetic.

EX#1: FN14ux to FN43 mj (647 miles)
24.5 deg (180 deg reverse would be 204.5 deg)
207.9 deg (180 deg reverse would be 27.9 deg)

EX#2: FN42bl to FN43mj (78.5 miles)
35.9 deg
216.5 deg

Thank-You
Mark K1MAP

There are some fine points that are affected by the shape of the earth, but most of the reason is simply spherical geometry. I just happened to lay my eyes, today, on a kid's ball where I drew lines to exhibit the reasons.

Think of two spots that happen to be on the equator. Say at the mouth of the Amazon, and the other side of Brazil to the west. The great circle path between them happens to be along the equator and the bearings between them will be 180 deg from each other (90 and 270).

Now as you go north, the lines of longitude are converging toward the North Pole where they meet. So let's think of two places at about the same latitude on opposite sides of the US, say Reno Nevada and Washington DC. Because

they are the same latitude, you might think the path between them is due east-west, but it isn't. Shoot a line out of Washington at 270 deg (perpendicular to North-south) and you will see that it actually passes below the latitude line running between the two cities. An eastward line out of Reno will also pass below the latitude line.

Now, the direct path between Reno and DC will actually be a great circle line and will run north of the latitude line between the two cities. So the azimuth of the great circle out of DC toward Reno should actually be a good bit north of due west. The path out of Reno will also be north of due east.

Of course it gets harder to visualize between random places, but the same concepts are why the two bearings are not 180 apart unless the two points are on the equator or on a line of constant longitude (due north-south).

Hope that word example helps. I can't mail my ball with the lines drawn on it.

-Rex, KK6MK

Good Morning Mark and the Net:

Back in high school we studied "Planar Geometry" and thought it was the "do all" and "end all" of trigonometry.

What they never told us is that there is another geometry... Spherical geometry.

Under planar geometry, the reverse angle is always 180.000 degrees different.

With spherical geometry the line of bearing (LOB) "to" can be different than the LOB "from"

By up to a small amount.

My best reference for spherical geometry is the ITT radio reference book.

Stan, WILE Cape Cod

Yes, that's a great summary. Look at a sphere with the coordinate system we use and you'll see that the lines of longitude are great circles converging at the poles. They are not parallel. The bearing from any point to another will not have the same reciprocal bearing except for two conditions.

One is at the equator as you mentioned. The other is when both are at the same longitude. In this case the bearings are always going to be 0 degrees and 180 degrees.

73, Zack W9SZ

I think you meant to say that the "from" and "to" would be different *from 180* by a small amount. For most of us, operating terrestrially, not too far apart, in comfortable latitudes, that would be true, but the small amount can get large. One obvious case is two spots in the northern hemisphere, but at longitudes that are 180 degrees apart. In that case, the path between them will run through the North Pole and the bearing for both of them will be the same, 0 degrees, or 180 degrees from 180 degrees.

So I just wanted to point out that the difference from 180 for forward vs. reverse can get quite large in some cases.

Rex

Hello Rex, Stan, Zack

Thanks for the examples and explanations. I guess that I should have figured out that the great circle route is the most direct and even affects a path much shorter, even if the path is not near the poles.

The examples you've mentioned clearly show me that it is important to use a bearing calculator when setting up for a microwave shot, and not to take the reverse of just one of the bearings.

During the last 10GHz contest, I used a 180deg correction of one bearing for the reverse bearing. At mid-latitude, with a 100 or 200 mile path and a small dish, it works OK. I don't believe that we missed any shots due to bearing error. But, as you pointed out with the 180 deg opposite latitude near the pole example, that the more north you go and the longer the path there is, real trouble could happen using the 180 deg correction.

In example #2, I would have been .6 deg off using a 180deg reverse bearing.

But, in example #1, it was 3.4deg. That is starting to get significant. #1 was the shot from K1WHS, in Maine to me in North Carolina on Sept 22, after the contest. Due to very good conditions, we made the contact. But, I'm going to be more careful in the future!

73

Mark K1MAP

This effect is due to the earth being spherical. Opposite bearings being 180 degrees from each other is only exactly true for planar geometry. This is easiest to grasp at the equators and poles. Someone else has posted about the equator. At the pole, one has bearings to stations from 0 to 360, but for those close to the pole, the only bearing to the station at the North Pole is 0 degrees, or north.

Some time spent with a globe or a ball, or a ball with a globe on it is beneficial in understanding this phenomena. A surveyor is probably the best person to explain this phenomena, they work with the practical implications of this every day. - Duffey

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KK6MC

James Duffey

Cedar Crest NM

A nice treatment of Inverse azimuth calculations can be found at

http://www.ngs.noaa.gov/TOOLS/Inv_Fwd/Inv_Fwd.html

Ted WA8ULG

There is another factor I saw during the 10G+ second weekend. If the other station is not aimed at you and you are doing tropo scatter, you have to share the scattering volume. The signal won't be strongest on the geometric path if they are illuminating some sky away from that patch. Sometimes it showed up as peaking above the horizon, sometimes above the horizon and away from the great circle path.

And there's a further factor that the over the horizon refraction is affected by weather, local inversion, local uplift (sun shining on a plowed field vs. sun shining on a lake), and other micrometeorological conditions. And it's not sure that an inversion layer giving enhanced refraction is parallel to the earth's surface, it could be tilted and makes the best path be off the great circle route.

Point is, the great circle bearing is a good start, then vary azimuth and elevation to peak the signal. One end at a time.

73, Jerry, K0CQ



Greg, K6QPV and Chip, N6CA listen to stories at the Nov SBMS meeting.



Pat, N6RMJ checks out Rien's WSPR mode on computer.



Rein, W6SZ spoke about WSPR mode digital communications at the Nov SBMS meeting. The San Bernardino Microwave Society is a technical amateur radio club affiliated with the ARRL having a membership of over 90 amateurs from Hawaii and Alaska to the east coast and beyond. Dues are \$15 per year, which includes a badge and monthly newsletter. Your mail label indicates your call followed by when your dues are due. Dues can be sent to the treasurer as listed under the banner on the front page. If you have material you would like in the newsletter please send it to Bill WA6QYR at 247 Rebel Road Ridgecrest, CA 93555, bburns@ridgecrest.ca.us, or phone 760-375-8566. The newsletter is generated about the 15th of the month and put into the mail at least the week prior to the meeting. This is your newsletter. SBMS Newsletter material can be copied as long as SBMS is identified as source.

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